United States Department of Agriculture	Forest Service	Wallowa-Whitman National Forest	La Grande Ranger District 3502 Highway 30 La Grande, OR 97850

Date: 04/15/2019

Subject: Sheep Creek – Fire/Fuels Existing Conditions

To: Breezy Carollo

The purpose of this report is to describe the existing conditions in the Sheep Creek project area. Information sources used to complete this report include:

- National Cohesive Wildland Fire Management Strategy (Cohesive Strategy)
- Wallowa-Whitman Land and Resource Management Plan
- Forest GIS layer and oracle database (based on stand exams), and field reconnaissance.
- Fuels Management Analyst Suite (FMA+)
- Fire Regime Condition Class Guidebook
- Fuels Characteristic Classification System (FCCS)
- Union County Community Wildfire Protection Plans (CWPP)
- Interagency Fuels Treatment Decision Support System (IFTDSS)

PROJECT AREA DESCRIPTION

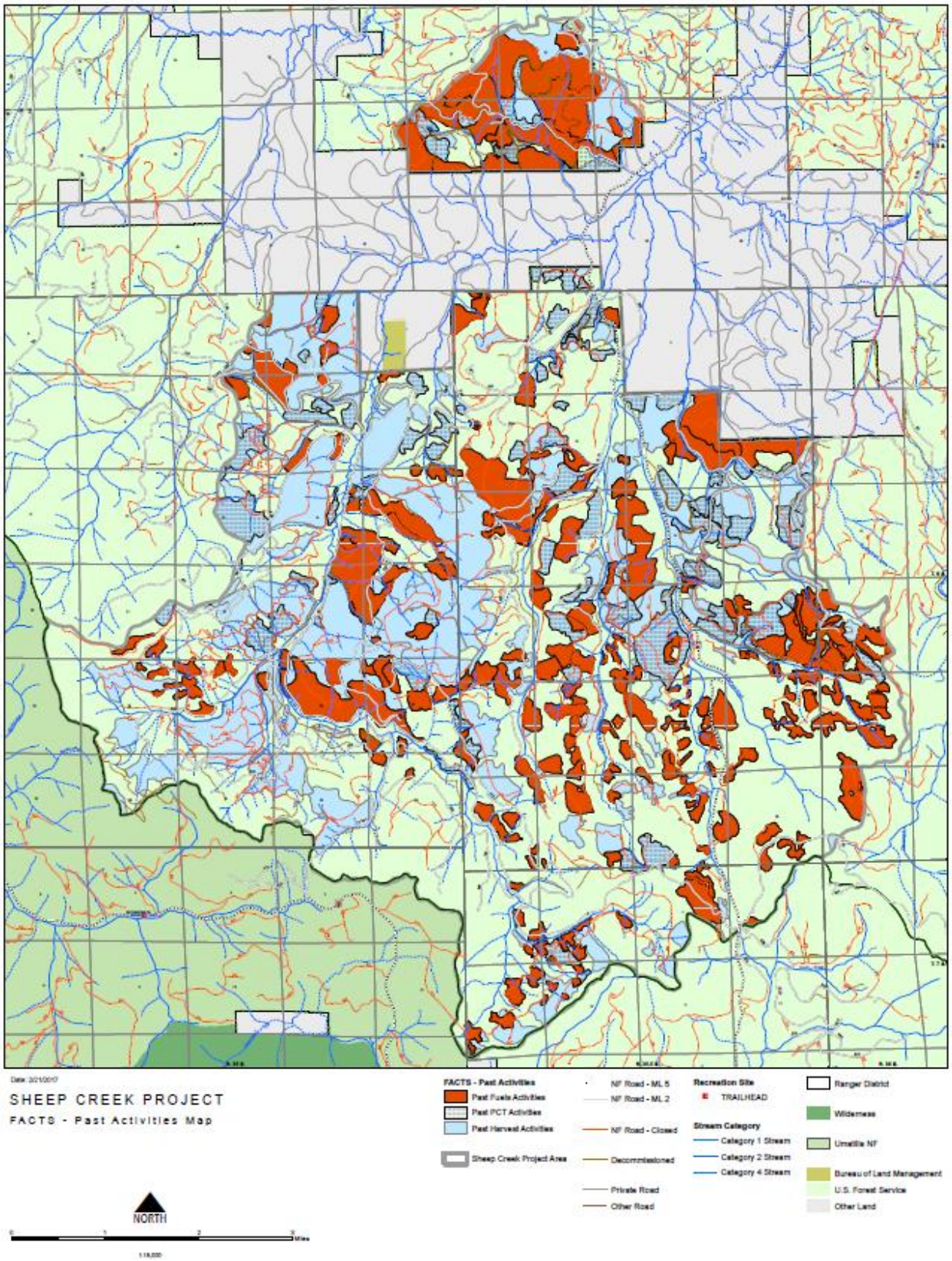
The Sheep Creek project area is approximately 29,951 acres in size and located on the Wallowa-Whitman National Forest. The project area is approximately 22 miles southwest of La Grande, Oregon and 22 miles northeast of Ukiah, Oregon. Elevation ranges from 4400 feet along the northeastern boundary of the project area (adjacent to private property near the Vey Ranch) to approximately 6000 feet on Chicken Hill in the southeast corner of the project area.

BACKGROUND

A century of wildfire suppression and exclusion, grazing, and extensive timber harvesting have interacted to alter the structure, composition, and disturbance regimes within the project area. The forested stands within the project area lack a large tree component are now much more dense and uniform in their composition. These density changes have contributed significantly in shifting disturbance regimes toward less frequent, but larger and more severe disturbance events. These conditions put large portions of the ecosystem at high risk for an uncharacteristically large and severe fire.

Past Management Actions: The lower elevations of the project area have seen extensive timber harvest activities for over a 100 years. Splash dam and rail road logging in the early 1900's removed most of the large diameter ponderosa pine allowing lodgepole pine to become over represented in a

large portions of the project area. Many of these stands no longer have an adequate late serial seed source and have limited opportunity for proper stand succession. The following map shows the placement of past harvest and fuels reduction treatments within the project area.



Since 1962 there has been 17,988 acres of timber harvest treatments within the project area. Many of these stands are now comprised of widely spaced overstory trees with a dense layer of young trees. The following photos depict existing conditions within many of the past timber harvest units.

Prescribed fire has only been implemented on approximately 3000 acres within the project area over the last 50+ years. Many of the stands are now in need of pre commercial thinning.

Cohesive Wildfire Strategy (CWS)

In 2009, Congress passed the Federal Land Assistance, Management, and Enhancement Act (FLAME Act), which directs the U.S. Department of Agriculture (USDA) and the Department of the Interior (DOI) to develop a national cohesive wildland fire management strategy to comprehensively address wildland fire management across all lands in the United States. Under the direction of the intergovernmental Wildland Fire Leadership Council (WFLC), the National Cohesive Wildland Fire Management Strategy effort (Cohesive Strategy) was initiated in 2010 through a three-phased approach to planning, risk analysis, and collaboration by Federal, state, local and tribal governments and non-governmental partners and public stakeholders.

The National Strategy recognizes and accepts fire as a natural process necessary for the maintenance of many ecosystems, and strives to reduce conflicts between fire-prone landscapes and people. By simultaneously considering the role of fire in the landscape, the ability of humans to plan for and adapt to living with fire, and the need to be prepared to respond to fire when it occurs, the Cohesive Strategy takes a holistic approach to the future of wildland fire management.

The Wildland Fire Leadership Council (WFLC) adopted the following vision for the next century:

> ***To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.***

The primary, national goals identified as necessary to achieving the vision are:

> **Restore and maintain landscapes**: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

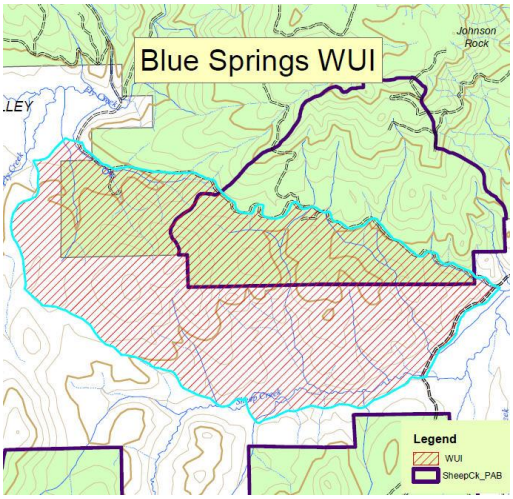
Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. Stakeholders collaboratively established the following guiding principles and core values for wildland fire management to guide fire and land management activities:

- Reducing risk to firefighters and the public is the first priority in every fire management activity.
- Sound risk management is the foundation for all management activities.
- Actively manage the land to make it more resilient to disturbance, in accordance with management objectives.
- Improve and sustain both community and individual responsibilities to prepare for, respond to, and recover from wildfire through capacity-building activities.
- Wildland fire, as an essential ecological process and natural change agent, may be incorporated into the planning process and wildfire response.
- Fire management decisions are based on the best available science, knowledge, and experience, and used to evaluate risk versus gain.
- Local, state, tribal, and Federal agencies support one another with wildfire response, including engagement in collaborative planning and the decision-making processes that take into account all lands and recognize the interdependence and statutory responsibilities among jurisdictions.
- Where land and resource management objectives differ, prudent and safe actions must be taken through collaborative fire planning and suppression response to keep unwanted wildfires from spreading to adjacent jurisdictions.

Adjacent Wildland Urban Interface

The Wildland-Urban Interface (WUI) is the area or zone where structures and other human development meet or intermingle with wildland or vegetative fuels. A portion of the Blue Springs WUI as identified in the Union County Community Wildfire Protection Plan (CWPP) is within the project area.



Management Areas
Management Area descriptions, specific direction and guidance relating to fire management are described below. The following three management areas (MA) represent the bulk of the acres within the Two Eagle project boundary:

MA1 and MA1W - Timber Production Emphasis (84%)
Management emphasizes wood fiber production on suitable timber lands while providing relatively high levels of forage and recreational opportunities. Temporary forage increases result from silvicultural activities. Timber is managed according to Forest-wide standards and guidelines.

Direction

- Use prescribed burning from planned ignitions to accomplish fire protection, site preparation, silvicultural, wildlife, and livestock objectives.
- In ecosystems where fire is not a useful treatment tool, fuel treatments other than burning will be used to reduce fuel accumulations to meet resource management objectives.
- ***Prescribed fire from unplanned ignitions will not be used due to the high resource values and the difficulty in controlling ignitions.***
- ***Design suppression practices to protect the investment in managed tree stands and to prevent losses of large acreages to wildfire. This area is high priority for suppression of wildfires.***
- Avoid felling snags that do not present a hazard to life or a threat to successful suppression action.
- The minimum acceptable suppression for wildfires at all Fire Intensity Levels (FIL's) will be "contain".

Management Area Guidance

- All techniques and equipment are appropriate for use in suppressing wildfire, dependent upon the fire intensity level and protection needs of the timber stand.
- The broadest application of prescribed fire will be in ponderosa pine stands.
  1. Some slash and larger dead material will be left as ground cover for soil protection, microclimates for the establishment of trees, and small mammal habitat.
- Fuel loading will consist of natural accumulations except as modified by prescribed fire.

MA3 and MA3A – Wildlife/Timber Emphasis (13%)
Management Area 3 is similar to MA-1 and emphasizes wood fiber production. However, timber management is designed to provide near optimum cover and forage conditions for big game summer and winter ranges.

Direction

- Favor prescribed fire slash treatment methods when feasible. Prescribed fire from both planned and unplanned ignitions will be used to achieve winter range management objectives, and maintain diversity within plant communities.
- The minimum acceptable suppression response will be "confine' on FIL1-2-3 and contain on FIL 4 and greater.

Management Area Guidance

- All techniques and equipment are appropriate for use in suppressing wildfire, dependent upon the fire intensity level and protection needs of the timber stand.
- The broadest application of prescribed fire will be in ponderosa pine stands.
  2. Some slash and larger dead material will be left as ground cover for soil protection, microclimates for the establishment of trees, and small mammal habitat.
- Fuel loading will consist of natural accumulations except as modified by prescribed fire.

EXISTING CONDITIONS – FIRE AND FUELS

The fire environment includes available fuels (vegetation), existing topography, and weather. These elements together define fire behavior.

TOPOGRAPHY: Topography influences on fire behavior include slope, aspect, wind speed, and wind direction. Slopes in this analysis area are quite steep, in some areas in excess of 60%. Slope increases fire behavior by preheating fuels upslope of the fire and enabling spotting from rolling and aerial fire brands. Flame length and rate of spread increase with increasing slope. Aspect is the direction a slope faces. All aspects are represented in this analysis area. South and Southwest aspects typically experience fire more frequently due to the duration of sun exposure. North aspects typically have higher levels of biomass/fuels and are susceptible to high intensity wildfire during the summer months.

WEATHER: Summers are typically hot and dry with day time temperatures in the high 80's to lower 90's Fahrenheit with relative humidity's in the teens (with poor overnight recovery). Lightning caused fires primarily occur in the months of July and August. These storms produce lighting and strong winds, often with little or no precipitation. Of particular concern are the strong gusty winds, often associated with a frontal passage, especially dry cold fronts.

The following weather parameters represent conditions that can generate a large wildfire within the project area.

Large Wildfire Environmental Conditions	
Temperature (F)	85
Relative Humidity (%)	15

1 hour fuel moisture (%)	2
10 hour fuel moisture (%)	3
100 hour fuel moisture (%)	4
1,000 hour fuel moisture (%)	8
Foliar Moisture Content (%)	105
20' Level Wind speed (mph)	20
The environmental conditions for the area were derived from historical weather data from the Johnson Ridge Remote Automated Weather Site (RAWS) and observations from past large wildfires adjacent to the project area.	

FUELS: this is the only component of the fire environment that can be altered by management actions. Many elements of fuels work together to influence fire behavior including: vertical and horizontal distribution, continuity, moisture, chemical content, compaction and loading. These elements can be modified to reduce fire behavior.

Surface Fuels: The following definitions were obtained from review of literature: A*ssessing Crown Fire Potential by linking models of surface and Crown Fire Behavior, "Scott and Reinhardt, 2001; and "Fire and Fuels Analysis to Support Project Planning, "Langowski, 2002*.Surface Fuels have been classified into four groups – grasses, brush, timber, and slash. The differences in fire behavior among these groups are related to fuel load and its distribution among the fuel classes. Fuel load and depth are significant properties for predicting whether a fire will be ignited, its rate of spread, and its intensity. The amount of surface fuel is a measure to help determine a surface fire's potential to spread into tree crowns. Surface fuel loading is one of the primary components used to predict fire intensity and potential fire behavior.

Standard Fire Behavior Fuel Models (Scott and Burgan, 2005) within the Sheep Creek project area.

Fuel Model	% of Project Area
GS2	9
TU1	6
TU5	60
TL3	15
TL5	1
TL8	7
Other	2
Total	**100**

GS2 – The primary carrier of the fire is grass and shrubs. High spread rates and moderate intensity fire.

TU1 - The primary carrier of the fire grass or shrubs with timber litter, low spread rates and low intensity fire.

TU5 - The primary carrier of the fire is heavy forest litter with a shrub or small tree understory. Moderate spread rates and intensity.

TL3 - The primary carrier of the fire is dead and down fuel beneath forest canopy. Moderate load of conifer litter. Spread rate very low, low intensity fire.

TL5 - The primary carrier of the fire is a high load of conifer litter; light slash or down dead. Spread rate low. Fire intensity low.

TL8 – The primary carrier of the fire is long needle pine litter. Spread rate moderate with low fire intensity.

Crown Fuels: Crown fuels are defined as the live and dead material in the canopy of trees. Canopy bulk density is used for determining if a fire reaching into the canopy has sufficient fuel to support a crown fire. Neither crown nor canopy bulk density can be directly measured. Instead they are mathematically estimated based on individual tree characteristics such as tree height and crown ratio (Fire and Fuels Analysis to Support Project Planning, Langowski, May, 2002). Overstocked conditions can be an indication of high canopy bulk density.

Ladder Fuels: Ladder fuels are intermediate shrubs, bushes, and trees that bridge the vegetation gap between surface fuels and tree crowns; thus the term ladder fuels. Canopy base height is the average height of the base of the tree crowns from the surface and would be used as a tool to measure ladder fuels. Flame length (related to surface fuels) and canopy base height can be used to estimate whether fire can travel into the crowns.

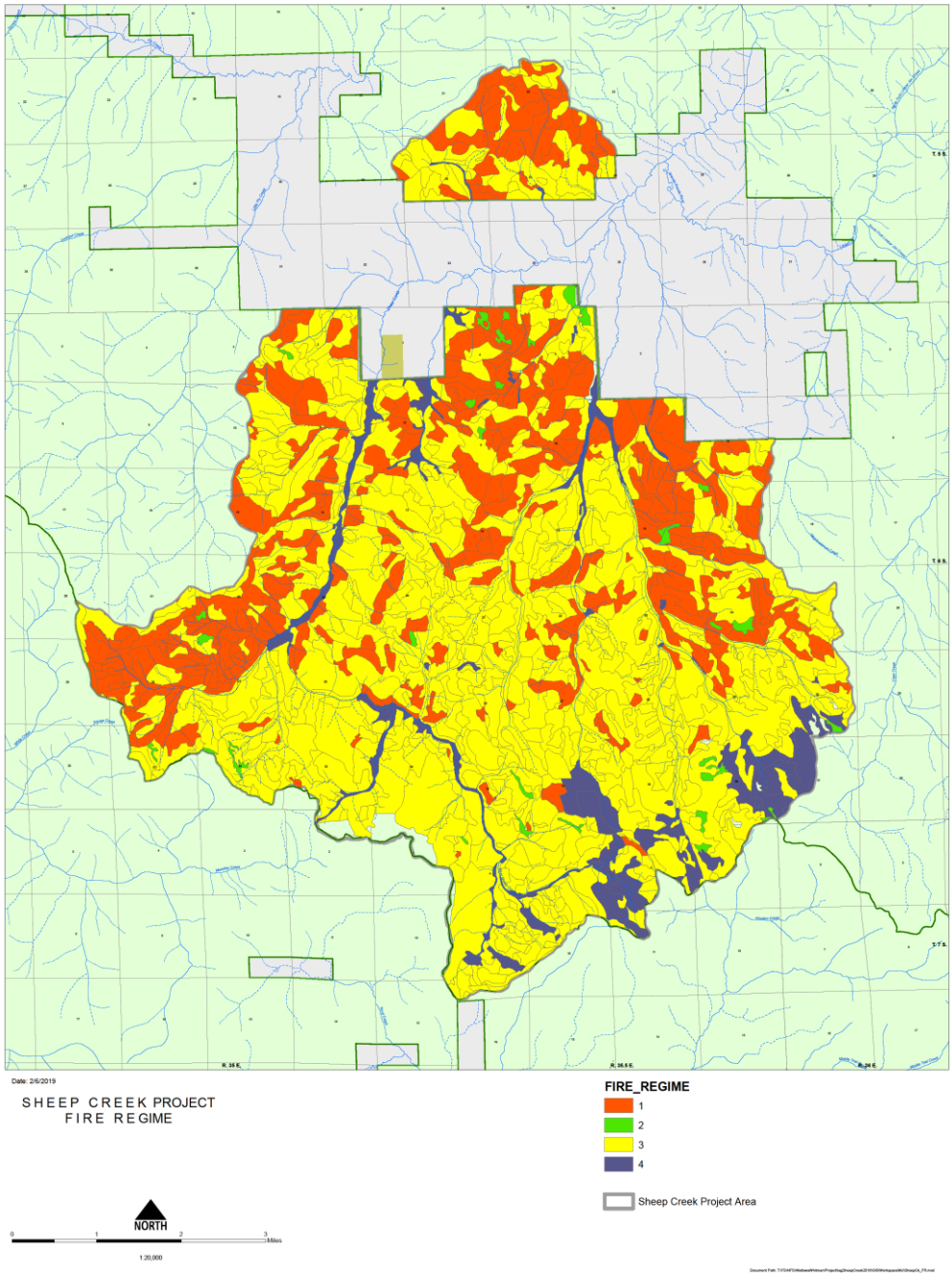
Fire Regimes - A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention but including the possible influence of aboriginal fire use. The five natural fire regime groups are classified based on the average number of years between fires combined with characteristic fire severity reflecting percent replacement of dominant overstory vegetation (FRCC Guidebook, 2010). The five natural fire regimes are defined as follows:

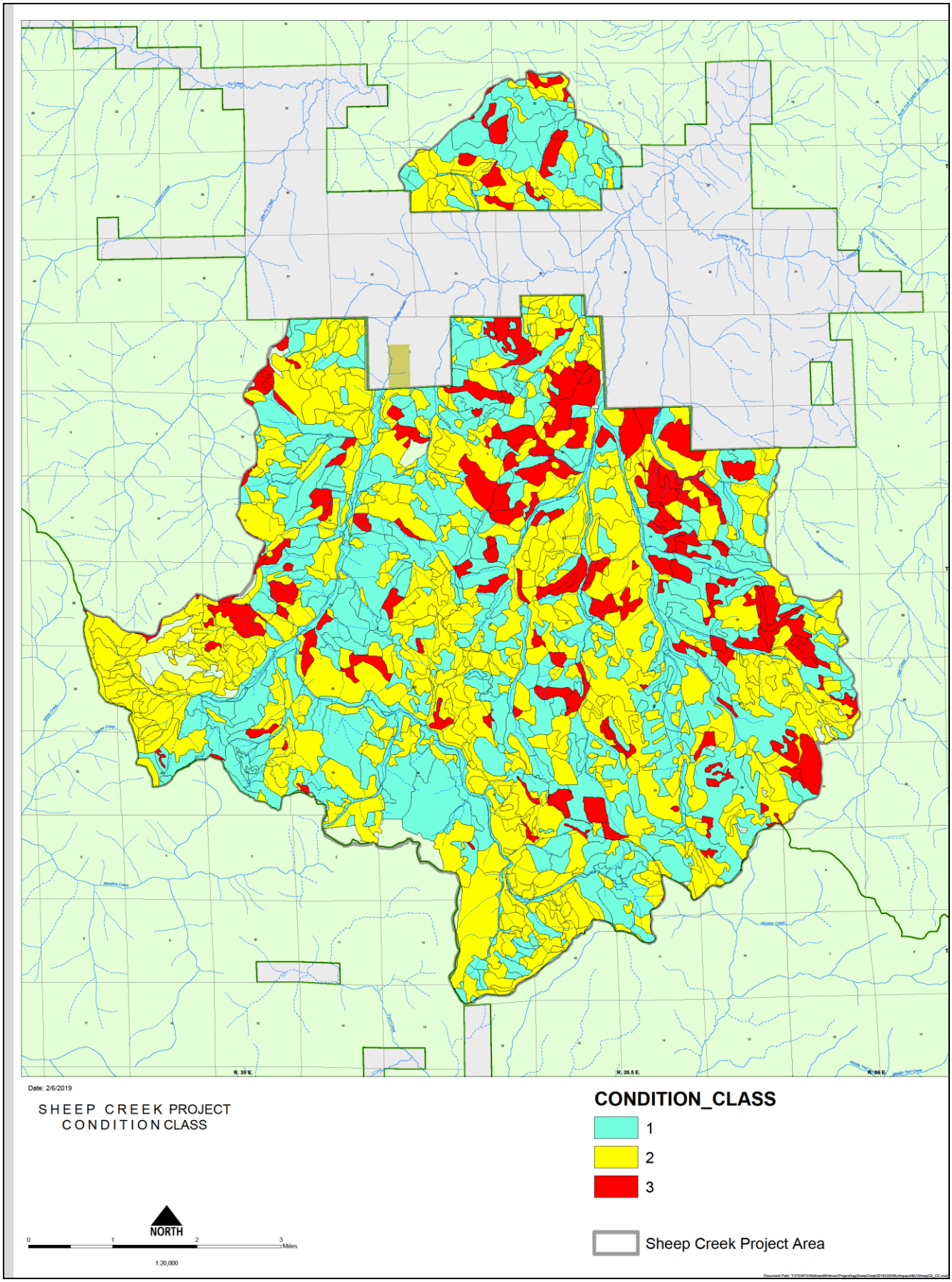
Fire Regime Groups and Descriptions				
Fire Regime Group	**Vegetation Types**	**Frequency (Fire Return Interval)**	**Representative Potential Natural Vegetation Group (PNGV)**	**Severity**
1	All ponderosa pine types; Dry-Douglas fir/ pine grass; and grand fir/pine grass.	0 – 35 years	(PPDF1) Ponderosa pine Douglas-fir Inland Northwest	Low severity
2	True grasslands	0 – 35 yrs.	(MGRA1) Mountain Grassland	Stand replacing, high severity
3	Mixed Conifer	35 – 200+ yrs.	(GFDF) Grand fir – Douglas fir	Mixed severity
4	Lodge pole pine, western larch, spruce	35 – 200+ yrs	(SPFI5) Interior West Lower Subalpine Forest	Stand replacing, high severity
5	Wet meadows, discontinuous grass scabs on ridge tops	Greater than 200 years	(RIPA) Riparian	Mixed severity

Fire Regime Condition Class (FRCC) is a classification of the degree of departure from natural fire regime. The fire regime condition class classification is based on a relative measure describing

the degree of departure from the historical natural fire regime. The departure can result in changes to one or more of the following ecological components: vegetation (species composition, structural stages, stand age, canopy cover and mosaic pattern across the landscape); fuel composition; fire frequency, severity, and pattern.

Condition Class	Description
1	Represents ecosystems that are still within the historical range.
2	Represents ecosystems which been moderately altered from the historical range
3	Represents ecosystems with have been substantially altered from the historical range.

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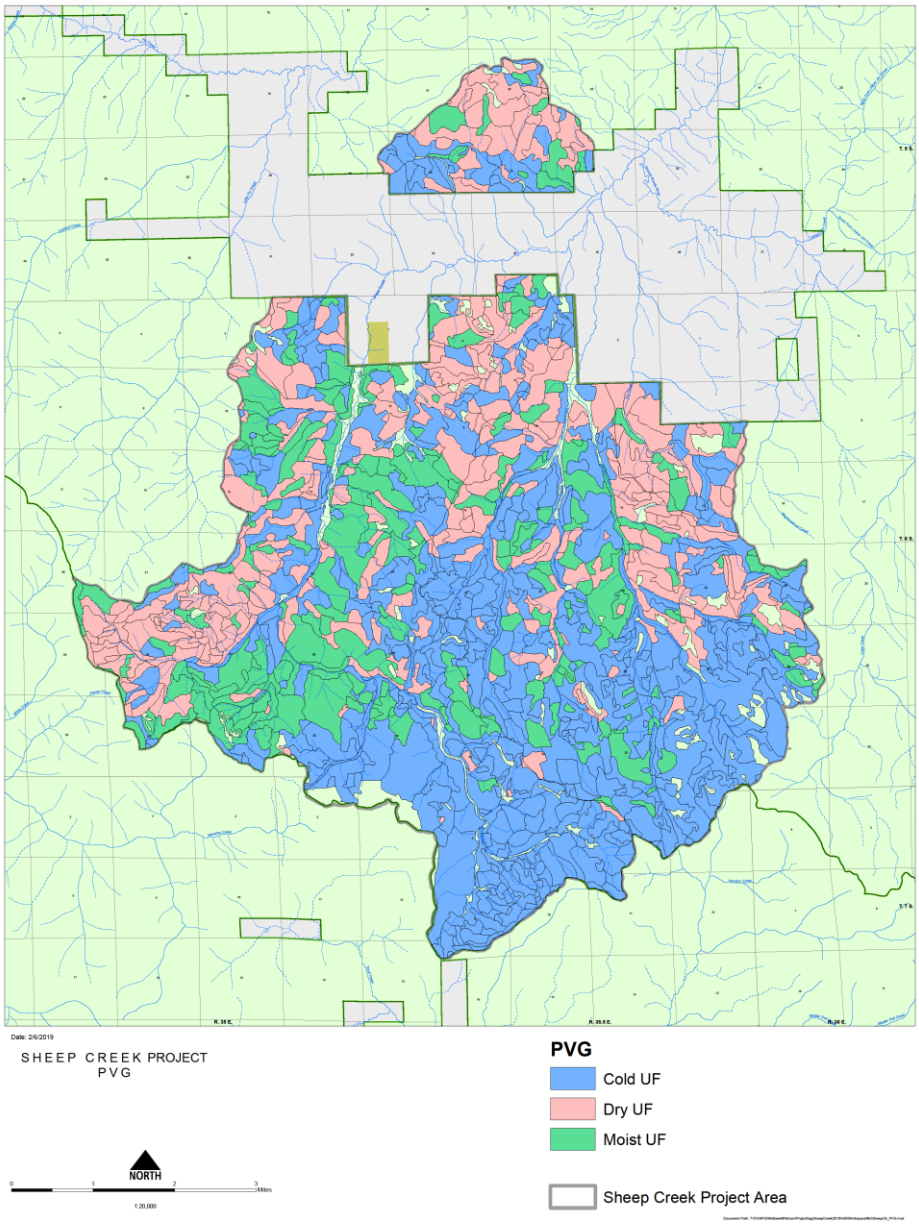
SHEEP CREEK PROJECT
CONDITION CLASS
CONDITION_CLASS
1
2
3
Sheep Creek Project Area
NORTH
0
1
2
3
Miles
1:20,000

Existing Fire Regime and Conditon Class acres within the Project Area					
Condition Class	Fire Regime				% of project area
	1	**2**	**3**	**4**	
1	3082	82	7752	1304	**41**
2	1772	0	11557	324	**46**
3	2982	175	182	189	**12**
% of project area	**26**	**1**	**66**	**6**	

Potential Vegetation Groups: potential vegetation group (PVG) is an aggregation of plant association groups (PAGs) with similar environmental regimes and dominant plant species. Each aggregation (PVG) typically includes PAGs representing a predominant temperature or moisture influence (Powell 2000).



PVG Groups within the Project area *(Upland Forest Only)*		
PVG	Acres	% of project area
Cold	14302	48
Moist	6243	21
Dry	8010	27

EXISTING FIRE BEHAVIOR WITHIN THE PROJECT AREA.

Fire Behavior Characteristics definitions:

Canopy base height – The lowest height above the ground above which there is sufficient canopy fuel to propagate fire vertically (Scott and Reinhardt 2001).

FCCS Fuel Bed – The inherent physical characteristics of fuels that contribute to fire behavior and effects. Fuel Characteristic Classification System (FCCS) describes fuelbeds in 6 horizontal layers including canopy, shrubs, nonwoody fuels, woody fuels, litter, lichen-moss, and ground fuels. Each layer, or stratum, is further divided into one or more categories to represent the complexity of wildland and managed fuels.

The FCCS was used to represent the past, current and future conditions of the vegetation within the project area. A list of fuel beds was created representing major forest types, common management activities and natural disturbances. The following fuels beds were used to help define fire behavior modeling groups.

FCCS Fuel Bed 1518 – Warm, dry Douglas fir, ponderosa pine, grand fir forest. Stands are 25 to 40 years old, composed of low density of seedlings and saplings and have not managed since initiation. Douglas fir and ponderosa pine co-dominate the ovestory and grand fir and Douglas fir co-dominate the regengeration layer.

FCCS Fuel Bed 1542 – Cool, moist, grand fir forest. Established between 60 - 90 years ago after a wildfire or clear cut and has no subsequent management.

FCCS Fuel Bed 1590 – Cool, moist lodgepole pine, western larch forest. Established after a clearcut harvest with woody fuels piled and burned 40 to 80 years ago. Stand was precommercially thinned at 10 to 20 years but has no subsequent management.

Crown Fire Potential – The potential for fire to reach canopy layer and to carry through the canopy.

Fire rate of Spread – Distance a fire will spread in one hour.

Fire Flame Length – The length of the flame in a spreading fire within the flamimg front.

FCCS Fire Potential Code – Three digit code representing the surface fire behavior, crown fire and available fuels potentials scaled to an index of 0-9. A FCCS code of 469 would represent a a fuelbed with moderate surface fire potential (4), above average crown fire

potential (6), and extreme potential for biomass consumpution (9). Comparing this to a fuelbed with a fire potential code of 222 would indicate that the second fuelbed is predicted to have much lower surface fire potential, much lower potential for crown fire and much lower potential for biomass consumption than the first.

***Spotting Distance from Torching Trees* –** Heavy accumulations of surface fuels and/or crown fuels increase the potential for spotting to occur. Spotting occurs when sparks or embers are carried by convection columns and/or wind or gravity starting new fires beyond the main fire. The maxium distance that one can expect potential spot fires resulting from firebrands from torching trees.

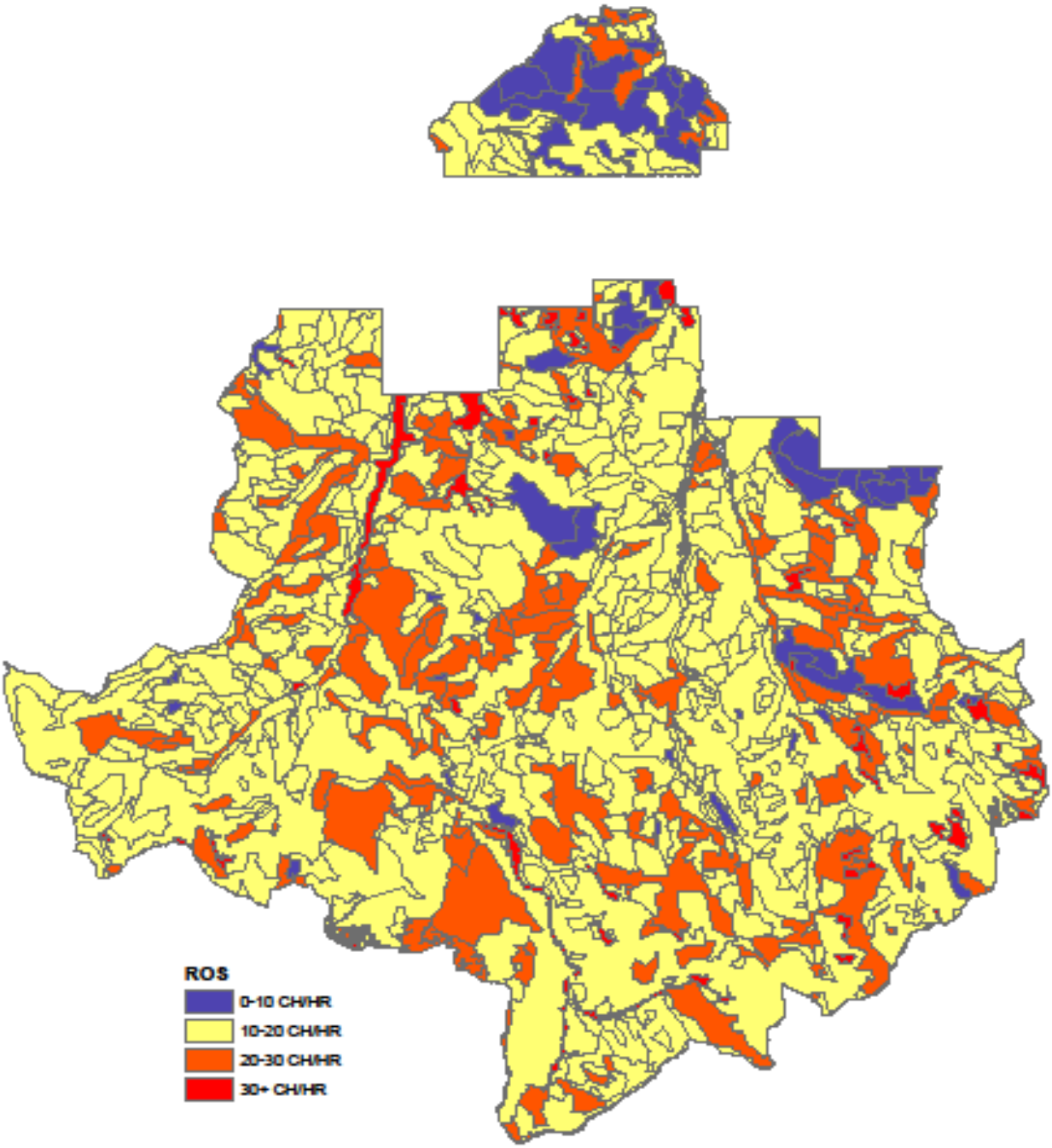
***Fire Behavior Modeling Groups*:** The stands within the project area were grouped into three modeling groups based on PVG, surface fuel loadings, crown fuel characteristics and potential fire behavior. Field inventory was completed on representative stands within each of the modeling groups to gather surface and crown fuel data. This data was then extrapolated to all the stands within each of the modeling groups and input into fire behavior models. The following table displays how the modeling groups were defined.

Modeling Group	PVG	Species description	Fire Regime	FCCS Fuel Bed
1	DUF	Ponderosa pine - Douglas fir	1	1518
2	MUF	Grand fir- Douglas fir	3	1542
3	CUF	Lodgepole – western larch	4	1590

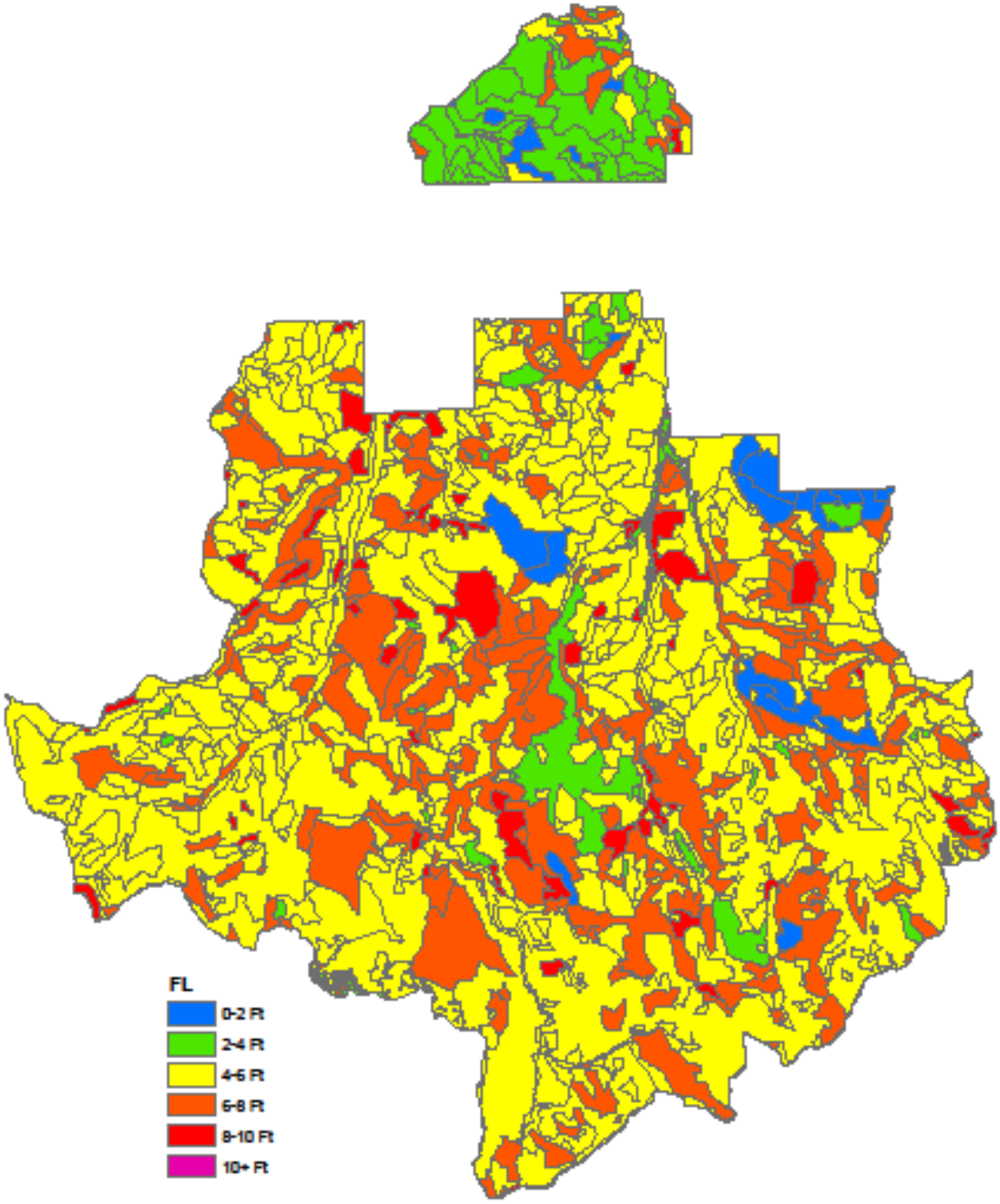
Stand data and field reconnaissance were utilized in multiple fire behavior modeling programs (FCCS, FVS-FFE and FMA Plus) to determine existing fire behavior for each modeling group. The following tables display stand characteristics and existing fire behavior at the 97 percentile weather for each modeling group.

Existing Fire Behavior Characteristics (FCCS)			
Modeling Group	1	**2**	**3**
Representative Fuel Model	TU5	TU5	TU5
FCCS Fuels bed	1518	1542	1590
Resultant Fire Rate of Spread (ch/hr)	33	57	42
Resultant Fire Flame Length (ft)	31	61	39
FCCS Fire Potential Code	554	465	354
Basal Area	84	172	159
Canopy Base Height	3	6	5
Size of fire in acres one hour after ignition	34	102.7	54.5
Canopy Bulk Density	.0018	.0054	.0031
Fire Type	Passive Crown Fire	Passive Crown Fire	Passive Crown Fire

Existing Conditions - Rate of Spread

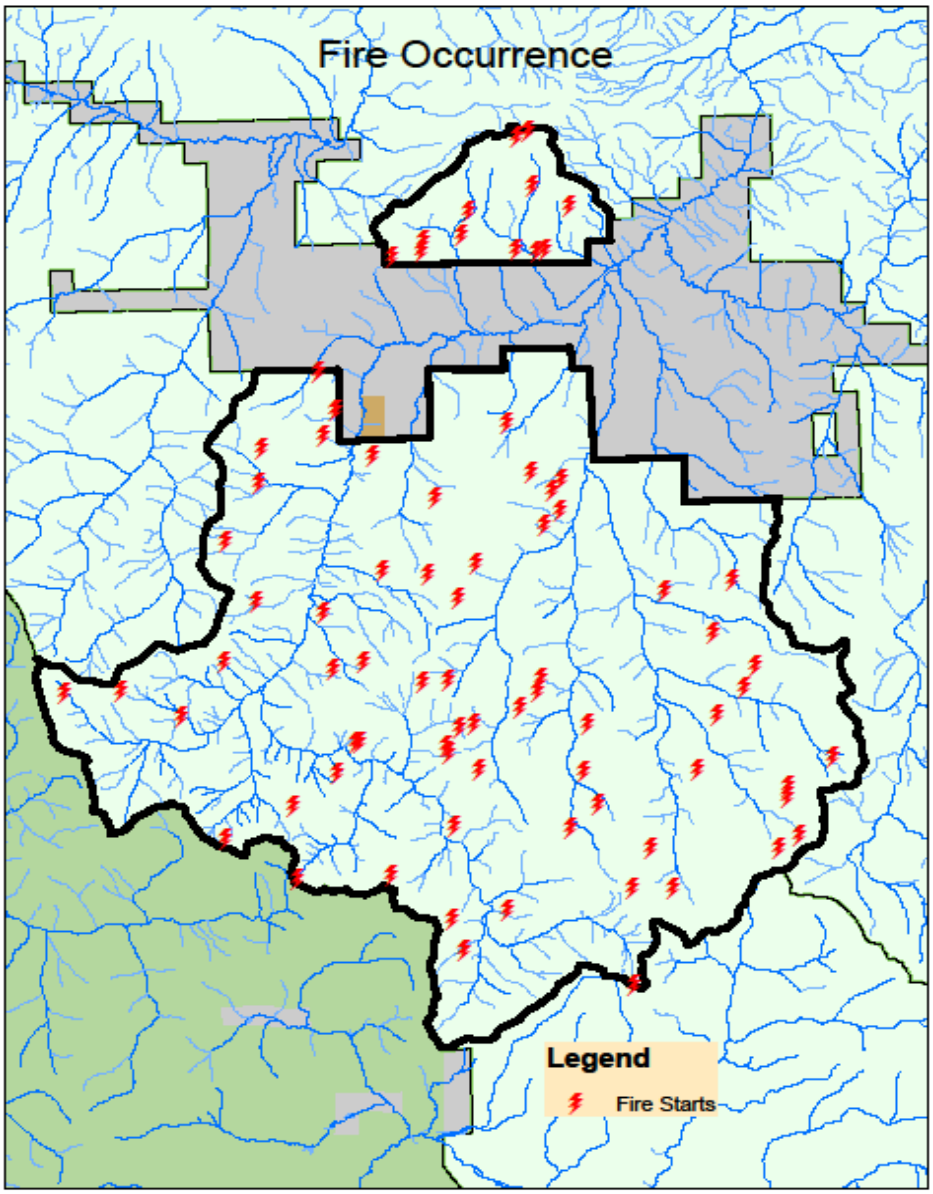


Alt1 Flame Lengths



FIRE HISTORY

Fire Occurrence: The Fire Occurrence rate equals the number of fires per year per 1,000 acres. The rate is used to compare average fire occurrence per year on a relative basis. The Wallowa-Whitman National Forest (WWF) has one of the highest wildfire occurrence rates in Oregon and Washington. The Sheep Creek project area had 79 documented ignitions from 1970 through 2018. The project area has a fire occurrence rate similar to what is found throughout the WWF. The following map shows the location of these ignitions.



COMPARISON OF AVERAGE ANNUAL FIRE FREQUENCIES AND OCCURRENCE RATES		
Years	**W-W Forest**	**Sheep Creek Project Area**
Avg Annual Fire Frequency	139.0	1.64
Fire Occurrence Rate per 1,000 acres	.06	.06

The highest vistor use comes at the time of year when fire danger levels have already peaked and have started to decline. A large elk population draws numerous hunters to the project area from late August through Novmeber. The majority of these hunters setup their camps in disperse sites. Although hunters have started wildfires, 81% of wildfires in the project area were caused by lightning. Wildfire suppression has been very successful within the project area over the past 48 years. Only 5 wildfires in that time period have exceeded one acre in size.

The following tables display fire statistics for the analysis area from **1970 - 2018**:

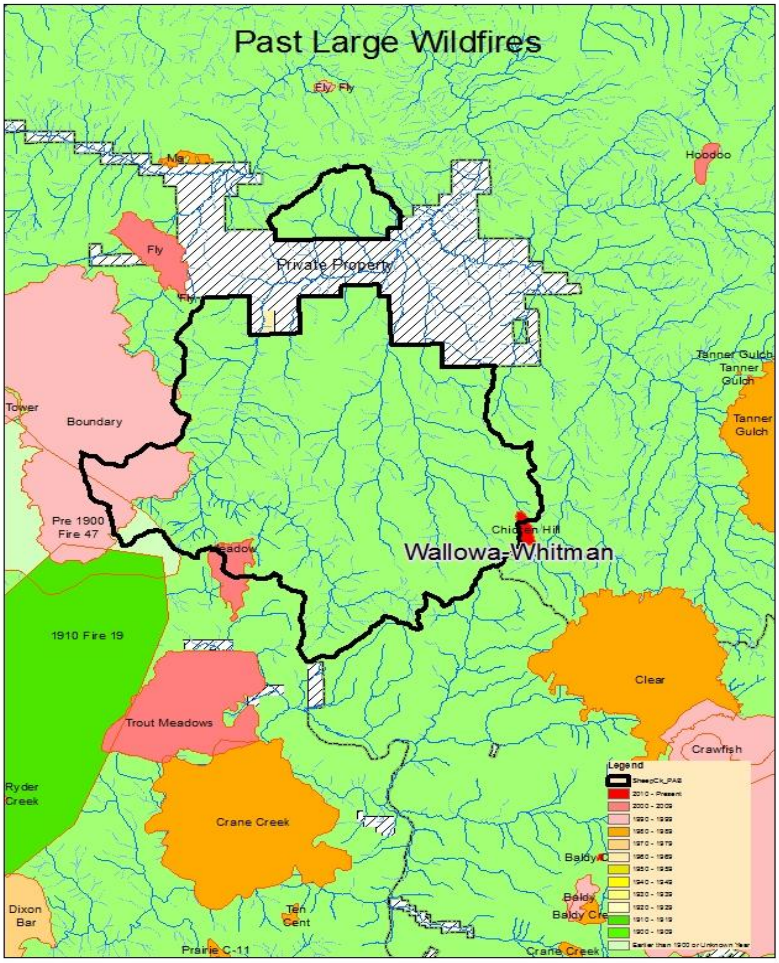
Past Fire by Size Class			
Size Class		**Total # of Fires**	**% of Fires**
A	Spot - .25 acres	74	94
B	.26 - 9.9 acres	3	4
C	10 – 99.9	0	0
D	100 – 299.9	1	1
E	300 - 999	1	1
F	1000 - 4,999	0	0
G	5000 +	0	0
	TOTAL	**79**	**100%**

Fire Cause			
Statistical Cause	**Code**	**Total # of fires**	**Percent of Fires**
Lightning	1	64	81
Equipment	2	0	0
Camp Fire	3	9	11
Warming Fire	4	0	0
Debris Burning	5	4	5
Railroad	6	0	0
Arson	7	0	0
Children	8	0	0
Other	9	2	3
	TOTAL	**79**	**100**

Large Fires Adjcanet to Project Area

There have been several large lighting caused wildfires adjacent to this project area. These fires spread quickly due to torching, crowning and spotting. The Boundary, Meadow and Chicken Hill

fires were ignited outside of the project area but burned into the Sheep project area and provide examples of expected fire behavior and intensity.



Large wildfire history within or adjacent to the Project Area				
Fire Name	**Year**	**Fire Intensity**	**Fire Severity**	**Acres**
Clear	1986	Active crown fire. Long range spotting	High	6,411
Boundary	1994	Active crown fire. Long range spotting	High/Mosaic	8,363
Tower	1996	Active crown fire. Long range spotting	High	51,502
Meadow	2000	Mostly passive crown fire with occasional active crown fire.	High	591
Fly	2005	Mostly passive crown fire with occasional active crown fire.	High	839
Chicken Hill	2011	Mostly passive crown fire with occasional active crown fire.	High	119

SMOKE

Background: Air quality describes the state of the surrounding air at any given time and is measured by the concentration of pollutants that are known to be harmful to the health and welfare of people and the environment. Air quality is regulated by the States under the authority of the Clean Air Act (1970). Amendments to the Act in 1977 established goals for preventing impairment of visibility in larger wilderness areas and national parks in existence at the time, placed controls on particulate emissions, and established monitoring requirements. Human sources of air pollution include industrial emissions, energy production and generation, automobile exhaust, and smoke from agricultural field burning, wildfires, and prescribed fires. Regulated pollutants include smoke, particulate matter, nitrogen oxides, sulfur dioxides, carbon monoxide, numerous volatile organic chemical compounds, and metals, including lead and mercury. Air pollutants can be further portioned into global sources that circulate with prevailing winds in the northern hemisphere and local or regional sources that may impact the Wallowa-Whitman National Forest from some distance, depending on prevailing wind and weather patterns.
Smoke, including fine particulate emissions from wildland fire (planned and unplanned ignitions), results in reduced visibility and haze at lower concentrations and can be hazardous to human health at moderate concentrations. Federal and State standards include protection of air quality-related values in Class I areas (wilderness areas greater than 5,000 acres that existed on or before August 1977; on the Wallowa-Whitman, this includes Eagle Cap, Monument Rock, and North Fork John Day Wilderness Areas).
The primary national forest activity in the Wallowa-Whitman National Forest influencing air quality is smoke production from wildfires and prescribed fires. Wildfires are recognized as a natural part and a recurring process in fire-dependent ecosystems. Some of the primary objectives of managed fuel reduction activities are to reduce the total amount of annual smoke emissions otherwise brought about by wildfires, to reduce the risk of high-severity and high intensity wildfires, and to lower the potential of smoke impacts to local communities and other smoke-sensitive areas.

***Clean Air Act*:** The project area is located approximately 22 air miles southwest of La Grande and is 3 air miles to the north of the "North Fork of the John Day Wilderness". All proposed activities must follow the federal Clean Air Act (CAA), as amended. The CAA is the legal system designed to protect human health (such as respiratory effects) and public welfare (such as visibility). The CAA establishes major air quality goals, and provides means and measures to attain those goals by addressing existing and potential air pollution problems. The Environmental Protection Agency (EPA) has the responsibility and authority to establish regulations and standards for carrying out the provisions of the Act. Region 10 of EPA covers Oregon, Washington, and Idaho.

Smoke generating activities in the project area would be coordinated with the Oregon Department of Forestry Smoke Management Division. The following areas are considered smoke sensitive:

1. North Fork John Day Wilderness (class 1 air shed) - Visibility protection during the peak recreational period of July 1, through September 15.
2. The communities of Baker City and La Grande.

Monitoring sites: Air quality monitoring sites are located in Baker City, Cove and La Grande.

CLIMATE CHANGE:

The earth has entered an area of rapid environmental changes. The warming and drying trend predicted under the climate change scenarios will also increase the likelihood of fires. These fires will be larger and more severe, especially at higher elevations. There will be fewer trees regenerating after a fire due to increased regeneration mortality from higher insect and pathogen activity *(Forest, Insect & Pathogens and Climate Change: Workshop Report, Beukema 2007).* Vegetation management actions will need to integrate adaptation strategies (actions that help ecosystems accommodate changes adaptively) and mitigation strategies (actions that enable ecosystems to reduce anthropogenic influences on global climate) into project design *(Climate change and Forest of the Future: Managing in the Face of Uncertainty, Milar, 2007*).

Adaptive strategies include:

1. Resistance options – manage forest ecosystems and resources so that they are better able to resist the influence of climate change or to stall undesired effects of change.
2. Promote resilience to change – resilient forests are those that not only accommodate gradual changes related to climate but tend to return toward a prior condition after disturbance either naturally or with management assistance. Promoting resilience is the most commonly suggested adaptive option discussed in a climate-change context *(Dale et al. 2001, Price and Neville 2003, Spittlehouse and Stewart 2003).* Forest management techniques such as prescribed burning or thinning dense forest, can make forest more resilient to wildfire and decrease fire emissions.
3. Enable forest to respond to change – This group of adaptation options intentionally accommodates change rather than resists it, with a goal of enabling or facilitating forest ecosystems to respond adaptively as environmental changes occur *(Milar, 2007).*

The following are mitigations strategies/actions that would enable ecosystems to reduce anthropogenic influences on global climate:

1. Sequester carbon
    - Restore healthy forest so that carbon can be efficiently stored in live trees.
2. Reduce emissions – Wildfire and extensive forest mortality as a result of insect and disease are primary sources of unintentional carbon emissions from forests in the western United States *(Stephens 2005).*
    - Reduce density of small diameter trees. One means of slowing the release of sequestered carbon is to increase forest resistance to fire, drought, and disease, by reducing the density of small trees *(Stephens and Moghaddas, 2005)*.
    - Reduce emissions from wildfires and prescribed burns by reducing surface fuel loading.

DESIRED FUTURE CONDITION

Fire Resilent Landscapes

It is desired that fire regimes return to or are maintained within or near to their historical range of frequencies (in years) and exhibit fire behavior, effects and other associated disturbances similar to those that occurred prior to fire exclusion. Vegetation densities across the landscape create

conditions that are ecologically resilient, sustainable, and compatible with desired levels of disturbance processes.

Fire Behavior in Strategic Fuels breaks

Vegetation conditions and surface fuel loading within the strategic areas along ridegtops and/or adjacent to road systems will have surface fuel loadings, canopy base heights, canopy bulk densities that are unlikely to support a high intensty crown fire. The completed treatments would modify fire behavior to improve fire management response opportunities, improve firefighter and public safety, while reducing the wildfire threat to private property.

Desired Fire Behavior in Fire Regime 1 & 3		
Fire Rate of Spread (chains/hr)		<5
Fire Flame Length (feet)		<2
Canopy Base Height (ft)		>10
Fire size 1 hour after ignition (ac)		<2
Canopy Bulk Density (lbs/ft3)		<.0023
Surface Fuel Loading 0-3”diameter (tons/ac)		3-6
FCCS Fire Potential Code	Surface Fuels	<3
	Crown Fire	<4
	Available Fuel Potential	<4

Smoke: National forest air quality complies with national and State ambient air quality standards and State air quality and smoke management plans. Air quality within the national forest is sufficient to protect the environment, human health, and safety. Air quality in Class I wilderness areas is consistent with Clean Air Act regulations and meets applicable State and Federal air quality standards.